



Full wwPDB X-ray Structure Validation Report ⓘ

May 23, 2020 – 04:44 pm BST

PDB ID : 3ICD
Title : STRUCTURE OF A BACTERIAL ENZYME REGULATED BY PHOSPHORYLATION, ISOCITRATE DEHYDROGENASE
Authors : Hurley, J.H.; Thorsness, P.E.; Ramalingam, V.; Helmers, N.H.; Koshlandjunior, D.E.; Stroud, R.M.
Deposited on : 1989-12-28
Resolution : 2.50 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Xtrriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

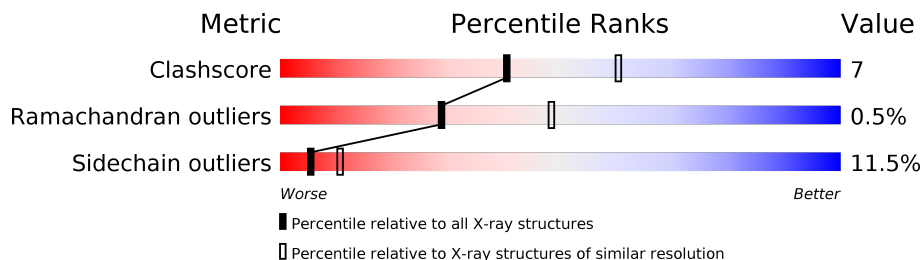
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	416	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 3254 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called ISOCITRATE DEHYDROGENASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	414	3146	2007	531	590	18	0	0	0

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	108	Total	O	0	0
			108	108		

4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	105.10Å 105.10Å 150.30Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	5.00 – 2.50	Depositor
% Data completeness (in resolution range)	(Not available) (5.00-2.50)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, R_{free}	0.180 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	3254	wwPDB-VP
Average B, all atoms (Å ²)	27.0	wwPDB-VP

5 Model quality [i](#)

5.1 Standard geometry [i](#)

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.84	0/3207	1.67	62/4345 (1.4%)

There are no bond length outliers.

All (62) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	119	ARG	NE-CZ-NH1	-13.32	113.64	120.30
1	A	160	TYR	CB-CG-CD2	-11.27	114.24	121.00
1	A	129	ARG	NE-CZ-NH1	-9.85	115.38	120.30
1	A	165	TRP	CD1-CG-CD2	8.74	113.30	106.30
1	A	208	ARG	NE-CZ-NH2	8.63	124.61	120.30
1	A	369	TRP	CD1-CG-CD2	8.23	112.89	106.30
1	A	244	TRP	CD1-CG-CD2	8.14	112.81	106.30
1	A	119	ARG	NE-CZ-NH2	7.94	124.27	120.30
1	A	244	TRP	CE2-CD2-CG	-7.93	100.96	107.30
1	A	180	ARG	NE-CZ-NH1	-7.88	116.36	120.30
1	A	361	GLU	CA-CB-CG	7.75	130.46	113.40
1	A	65	TRP	CD1-CG-CD2	7.61	112.39	106.30
1	A	222	ARG	NE-CZ-NH2	7.58	124.09	120.30
1	A	61	ARG	NE-CZ-NH2	7.46	124.03	120.30
1	A	389	VAL	N-CA-CB	-7.44	95.12	111.50
1	A	83	TRP	CD1-CG-CD2	7.43	112.25	106.30
1	A	189	ARG	NE-CZ-NH2	7.41	124.00	120.30
1	A	165	TRP	CE2-CD2-CG	-7.40	101.38	107.30
1	A	65	TRP	CE2-CD2-CG	-7.38	101.40	107.30
1	A	96	ARG	NE-CZ-NH2	7.36	123.98	120.30
1	A	83	TRP	CE2-CD2-CG	-7.31	101.45	107.30
1	A	380	MET	CG-SD-CE	-7.19	88.69	100.20
1	A	244	TRP	CG-CD2-CE3	7.14	140.33	133.90
1	A	133	TYR	CB-CG-CD2	-7.07	116.76	121.00
1	A	369	TRP	CG-CD1-NE1	-6.98	103.12	110.10
1	A	65	TRP	CB-CG-CD1	-6.98	117.93	127.00
1	A	365	ARG	NE-CZ-NH2	6.72	123.66	120.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	222	ARG	NE-CZ-NH1	-6.60	117.00	120.30
1	A	129	ARG	NE-CZ-NH2	6.47	123.53	120.30
1	A	132	ARG	NE-CZ-NH1	-6.26	117.17	120.30
1	A	234	MET	CA-CB-CG	-6.20	102.75	113.30
1	A	336	GLU	OE1-CD-OE2	-6.15	115.92	123.30
1	A	369	TRP	CE2-CD2-CG	-6.12	102.40	107.30
1	A	180	ARG	NE-CZ-NH2	6.06	123.33	120.30
1	A	263	TRP	CE2-CD2-CG	-6.00	102.50	107.30
1	A	96	ARG	NE-CZ-NH1	-5.97	117.32	120.30
1	A	165	TRP	CG-CD1-NE1	-5.95	104.15	110.10
1	A	250	ARG	NE-CZ-NH1	-5.95	117.33	120.30
1	A	283	ASP	CB-CG-OD1	5.89	123.61	118.30
1	A	308	TYR	CB-CG-CD2	-5.87	117.48	121.00
1	A	91	LEU	CA-CB-CG	5.70	128.42	115.30
1	A	225	VAL	CG1-CB-CG2	-5.58	101.97	110.90
1	A	65	TRP	CG-CD2-CE3	5.57	138.91	133.90
1	A	390	THR	N-CA-CB	-5.56	99.74	110.30
1	A	313	LEU	CB-CG-CD2	-5.49	101.67	111.00
1	A	132	ARG	CB-CG-CD	-5.49	97.34	111.60
1	A	15	THR	CA-CB-CG2	5.47	120.06	112.40
1	A	250	ARG	NE-CZ-NH2	5.47	123.04	120.30
1	A	244	TRP	CB-CG-CD1	-5.43	119.94	127.00
1	A	389	VAL	CB-CA-C	5.42	121.70	111.40
1	A	132	ARG	NE-CZ-NH2	5.41	123.00	120.30
1	A	93	ARG	NE-CZ-NH2	5.40	123.00	120.30
1	A	160	TYR	CG-CD1-CE1	-5.38	117.00	121.30
1	A	221	ASP	CA-CB-CG	5.37	125.22	113.40
1	A	160	TYR	CD1-CG-CD2	5.35	123.78	117.90
1	A	160	TYR	CA-C-N	5.28	128.81	117.20
1	A	112	ARG	NE-CZ-NH1	-5.26	117.67	120.30
1	A	83	TRP	CG-CD1-NE1	-5.22	104.88	110.10
1	A	165	TRP	CB-CG-CD1	-5.15	120.31	127.00
1	A	297	ASP	N-CA-CB	-5.13	101.37	110.60
1	A	189	ARG	NE-CZ-NH1	-5.10	117.75	120.30
1	A	388	THR	N-CA-CB	-5.06	100.69	110.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3146	0	3141	45	0
2	A	108	0	0	3	0
All	All	3254	0	3141	45	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 7.

All (45) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:16:LEU:HD23	1:A:96:ARG:HD2	1.75	0.68
1:A:162:GLY:HA2	2:A:519:HOH:O	1.93	0.67
1:A:305:ASN:O	1:A:309:ILE:HG12	1.97	0.65
1:A:401:LYS:HE3	1:A:403:LEU:HD11	1.78	0.64
1:A:288:GLN:HE22	1:A:292:ARG:HD3	1.63	0.63
1:A:154:GLU:HA	1:A:209:LEU:HD13	1.85	0.57
1:A:16:LEU:HD22	1:A:21:LEU:HD23	1.86	0.57
1:A:49:VAL:O	1:A:53:VAL:HG13	2.05	0.56
1:A:202:SER:O	1:A:206:THR:HG23	2.05	0.55
1:A:206:THR:HB	1:A:241:PHE:CD2	2.42	0.55
1:A:267:LYS:HE2	1:A:272:GLY:HA2	1.88	0.55
1:A:179:LEU:O	1:A:185:VAL:HG13	2.08	0.54
1:A:26:ASN:HA	1:A:62:LYS:O	2.07	0.53
1:A:4:LYS:NZ	1:A:4:LYS:HB2	2.23	0.53
1:A:289:ILE:HD12	1:A:313:LEU:HD13	1.91	0.53
1:A:280:VAL:HG22	1:A:285:PHE:HB2	1.90	0.52
1:A:115:ASN:O	1:A:119:ARG:HG3	2.11	0.51
1:A:401:LYS:HE3	1:A:403:LEU:CD1	2.43	0.49
1:A:117:ALA:O	1:A:121:GLU:HB2	2.12	0.49
1:A:134:TYR:O	1:A:137:THR:HG23	2.14	0.48
1:A:345:TYR:CD2	1:A:350:LYS:HD2	2.49	0.47
1:A:227:LEU:HD12	1:A:300:ALA:HB3	1.96	0.47
1:A:129:ARG:HB2	1:A:151:ILE:HB	1.97	0.46
1:A:44:ALA:O	1:A:48:VAL:HG13	2.15	0.46
1:A:304:LEU:O	1:A:307:ASP:HB3	2.16	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:37:ILE:HB	1:A:351:VAL:HG21	1.97	0.46
1:A:166:LYS:HE2	1:A:166:LYS:HB3	1.84	0.45
1:A:388:THR:HG21	2:A:470:HOH:O	2.17	0.45
1:A:255:GLY:HA2	1:A:265:LYS:O	2.17	0.44
1:A:30:PRO:HA	1:A:66:MET:O	2.18	0.44
1:A:126:ILE:O	1:A:327:ASN:HA	2.17	0.44
1:A:93:ARG:HD2	2:A:549:HOH:O	2.18	0.44
1:A:29:ILE:HD12	1:A:97:VAL:HG22	2.00	0.43
1:A:381:GLU:O	1:A:385:ASN:HB2	2.18	0.43
1:A:258:ILE:HD11	1:A:265:LYS:HG3	2.01	0.43
1:A:32:ILE:HG13	1:A:68:ILE:HG13	2.01	0.43
1:A:75:THR:HB	1:A:80:GLN:HA	2.01	0.43
1:A:7:VAL:HA	1:A:8:PRO:HD3	1.89	0.43
1:A:291:LEU:O	1:A:292:ARG:HG3	2.19	0.42
1:A:93:ARG:HD3	1:A:122:LEU:CD2	2.50	0.42
1:A:13:LYS:HG2	1:A:95:TYR:CE1	2.55	0.42
1:A:280:VAL:CG2	1:A:285:PHE:HB2	2.50	0.42
1:A:250:ARG:HG3	1:A:264:LEU:HD21	2.02	0.42
1:A:288:GLN:NE2	1:A:292:ARG:HD3	2.34	0.40
1:A:306:GLY:O	1:A:310:SER:OG	2.40	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	412/416 (99%)	395 (96%)	15 (4%)	2 (0%)	29 48

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	18	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	113	SER

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	323/338 (96%)	286 (88%)	37 (12%)	5 11

All (37) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	LYS
1	A	15	THR
1	A	16	LEU
1	A	26	ASN
1	A	27	PRO
1	A	39	VAL
1	A	48	VAL
1	A	80	GLN
1	A	82	VAL
1	A	91	LEU
1	A	121	GLU
1	A	131	VAL
1	A	173	GLU
1	A	187	LYS
1	A	206	THR
1	A	221	ASP
1	A	227	LEU
1	A	242	LYS
1	A	248	LEU
1	A	264	LEU
1	A	267	LYS
1	A	280	VAL
1	A	286	LEU
1	A	291	LEU
1	A	292	ARG

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	295	GLU
1	A	310	SER
1	A	313	LEU
1	A	350	LYS
1	A	358	LEU
1	A	361	GLU
1	A	364	LEU
1	A	375	LEU
1	A	380	MET
1	A	385	ASN
1	A	388	THR
1	A	389	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	26	ASN
1	A	80	GLN
1	A	288	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.